



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/730,382

12/09/2003

Zhiyun Chen

2476-36

2845

23117

7590

05/11/2007

NIXON & VANDERHYE, PC
901 NORTH GLEBE ROAD, 11TH FLOOR
ARLINGTON, VA 22203

EXAMINER

ANGEBRANNDT, MARTIN J

ART UNIT

PAPER NUMBER

1756

MAIL DATE

DELIVERY MODE

05/11/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/730,382

Applicant(s)

CHEN ET AL.

Examiner

Martin J. Angebrannndt

Art Unit

1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 2/28/07, 4/7/05 & 11/3/06.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 and 36-48 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-29 and 36-48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 2/28/07, 4/7/05 & 11/3/06.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application
- ☐ Other: _____.

Art Unit: 1756

1. The applicant's election has been received and made of record. Prosecution proceeds on the claims drawn to a methods of exposing a resist to pattern it with a reversible photo-bleachable layer coated upon it
2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1,2,7-9,11,16-22,25,27,28,36-39,43,44 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naito JP 2001-057329.

Naito JP 2001-057329 teaches a superresolution film of Sb which is contacted a bilayer resist. The resist is exposed using an i line (264 nm), the semiconductor substrate shifted 0.2 microns, the exposure repeated, the superresolution film removed and the resist processed to form the desired relief pattern with a high resolution. [0064-0068]. The super-resolution materials can be an organic material [0020-042]. Other materials for the super resolution film can be particles of metals or semiconductors and mixtures thereof [0043-0044]. These may be applied by sputtering, CVD or the like. [0044].

It would have been obvious to one skilled in the art to modify the cited example by replacing the Sb with semiconductor materials disclosed, such as Si, GaAs, AlInAs, InP, PbS, ZnS, ZnSSe, ZnTe, CdS, ZnO, CdTe, CdSe, CuS, and/or mixtures thereof, with a reasonable expectation of being able to achieve similar results in the process. Further, the examiner notes that sputtering inherently produces particles.

Art Unit: 1756

4. Claims 1-22,25,27,28-29,36-39 and 43-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naito JP 2001-057329, in view of Iida et al. EP 580346, Ichihara et al. '582, Todor et al. '328 or Liz-Marzan, et al. WO 99/291934.

Iida et al. EP 580346 teaches a shutter layer comprising particles of Si, GaP, GaN, AlAs, AlSb, AlP, SiC, ZnS, ZnSe, ZnTe, CdS, ZnO, CdTe, CdSe and the like dispersed in a polymer or glass matrix. These can be 0.1 to 50 nm in size and the matrix can be various glasses, PMMA, polycarbonate, polystyrene, polyolefins, epoxies and the like (3/11-41)

Todor et al. '328 teaches a shutter layer comprising particles of Si, GaP, GaN, AlAs, AlSb, AlP, SiC, ZnS, ZnSe, ZnTe, CdS, ZnO, CdTe, CdSe and the like dispersed in a polymer matrix (7/63-8/6). The matrix can be various polymers, PMMA, polycarbonate, polystyrene, polyolefins, epoxies and the like (9/1-19). These are also provided with a surfactant.

Ichihara et al. '582 teaches super-resolution films may be selected from Cu halide, Ag halide, Cu oxide, AgSe, AgTe, SrTe, SrSe, CaSi, ZnS, ZnO, ZnSe, ZnTe, CdS, CdSe, CdTe, AlTe, InS, InO, InSe, InTe, AlSb, AlN, AlP, AlAs, GaN, GaP, GaTe, GaAs, GaSb, GeS, GeSe, SnS, SnSe, SnTe, PbO, Si, SiC, AsTe, AsSe, SbS, SbSe, SbTe, BiS, TiO, MnSe, MnTe, FeS, MOS, CuAlS, CuInS, CuInSe, CuInTe, AgInS, AgInSe, AgInTe, CdGeP, ZnSiAs, ZnGeP, CuSbS, CuAsS, AgSbS, AgAsS, and the like dispersed in various dielectric materials including inorganic and polymeric materials.

Liz-Marzan, et al. WO 99/291934 teaches methods for stabilizing particles to prevent agglomeration/coalescence without affecting their properties.(2/16-22). The ligands which bond to the surface of the particles may be thiols, amines, phosphines, phosphates, borates, carboxylates, silicates, siloxy, ... and can form an inorganic coating as shown in figure 5b (3/10-

Art Unit: 1756

28). The stabilization of CdS and other semiconductor materials, having sizes of less than 100 nm, preferably less than 40 nm is disclosed. (7/24-8/17 and examples) The use of this technique for stabilizing the particles for optical uses in a variety of matrices, including polymers, is disclosed. (13/18-23).

In addition to the basis above, the examiner holds that it would have been obvious to one skilled in the art to modify the process rendered obvious by Naito JP 2001-057329, by using other super-resolution films, such as that disclosed by Iida et al. EP 580346, Ichihara et al. '582, Todoru et al. '328 or Liz-Marzan, et al. WO 99/291934, including those which are coated with other materials, stabilized with surfactants, and/or dispersed in matrices with a reasonable expectation of being able to achieve similar results in the process of the examples of Naito JP 2001-057329 based upon the disclosure of equivalence in the materials.

5. Claims 1-29,36-39 and 43-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naito JP 2001-057329, in view of Iida et al. EP 580346, Ichihara et al. '582, Todoru et al. '328 or Liz-Marzan, et al. WO 99/291934, further in view of Spoonhower et al. '300 and Tominaga et al. 745.

Spoonhower et al. '300 teaches with respect to figure 3, the recording of a near field image using a digitally programmable projected mask image (51) in a system where a near field solid immersion lens (SIL) lens is used.

Tominaga et al. 745 teaches with respect to figure 4a the use of SIL lens (21) together with a super resolution layer (3), which reduces the size of the light features.

In addition to the basis above, it would have been obvious to one skilled in the art to modify the processes rendered obvious by the combination of Naito JP 2001-057329 with Iida et

Art Unit: 1756

al. EP 580346, Ichihara et al. '582, Todor et al. '328 or Liz-Marzan, et al. WO 99/291934 by using programmable mask with an SIL imaging system such as that taught by Spoonhower et al. '300 with a reasonable expectation of being able to achieve similar results in the process of the examples of Naito JP 2001-057329, but with higher resolution based upon the use of the near field lenses based upon the disclosure of the use of SIL lenses with super resolution layers by Tominaga et al. 745.

6. Claims 1-22,25,27,28-29 and 36-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naito JP 2001-057329, in view of Iida et al. EP 580346, Ichihara et al. '582, Todor et al. '328 or Liz-Marzan, et al. WO 99/291934, further in view of Saito et al. '040

Saito et al. '040 teach the use of various light sources with an Sb or alloyed metal super resolution layer (43) imaging, including excimer lasers, emitting at 193, 248 or 157 nm. (6/38-52 and 7/28-52).

In addition to the basis above, it would have been obvious to one skilled in the art to modify the processes rendered obvious by the combination of Naito JP 2001-057329 with Iida et al. EP 580346, Ichihara et al. '582, Todor et al. '328 or Liz-Marzan, et al. WO 99/291934 by using other light sources, such as the excimer lasers disclosed by Saito et al. '040 emitting at 157, 193 or 248 nm with a reasonable expectation of success based upon the evidence of the use of these wavelengths with Sb super resolution films by Saito et al. '040.

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

JP 11-250501 teaches the use of a SIL with a super resolution film.


JP 06-044609 teaches a super resolution films using particles or metals, or semiconductors.

Fukuda et al. '569 teaches CEL layer where the layer returns the opaque state after the first exposure (embodiments VII and VIII)

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J. Angebranndt whose telephone number is 571-272-1378. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Martin J Angebranndt
Primary Examiner
Art Unit 1756

5/8/07